User Manual

Revision 1.001
English

NMEA2000 / CANopen - Converter

(Order Code: HD67250-A1 – HD67250-A3 – HD67250-A4)

for Website information:
www.adfweb.com?Product=HD67250-A1
www.adfweb.com?Product=HD67250-A3
www.adfweb.com?Product=HD67250-A4

for Price information:
www.adfweb.com?Price=HD67250-A1
www.adfweb.com?Price=HD67250-A3
www.adfweb.com?Price=HD67250-A4

Benefits and Main Features:

- Very easy to configure
- Low cost
- Electrical isolation
- Industrial temperature range: -40°C / 85°C (-40°F / 185°F)

HD67250-A1

HD67250-A3

HD67250-A4

For others Gateways / Bridges:

NMEA2000 to Modbus

See also the following links:
www.adfweb.com?Product=HD67225 (Modbus TCP)

CANopen to Modbus

See also the following links:
www.adfweb.com?Product=HD67001 (Modbus RTU Master)
www.adfweb.com?Product=HD67502 (Modbus RTU Slave)
www.adfweb.com?Product=HD67004 (Modbus TCP Master)
www.adfweb.com?Product=HD67505 (Modbus TCP Slave)

For others Gateways / Bridges:
For **CAN bus 2.0A** and/or **CAN bus 2.0B** to **Modbus**

See also the following links:
www.adfweb.com?Product=HD67011 (Modbus RTU Slave)
www.adfweb.com?Product=HD67012 (Modbus RTU Master)
www.adfweb.com?Product=HD67514 (Modbus TCP Slave)
www.adfweb.com?Product=HD67515 (Modbus TCP Master)

Do you have an your customer protocol?
See the following links:
www.adfweb.com?Product=HD67003

Do you need to choose a device? do you want help?
Ask it to the following link:
www.adfweb.com?Cmd=helpme

INDEX:

	Page
INDEX	2
UPDATED DOCUMENTATION	2
REVISION LIST	2
WARNING	2
TRADEMARKS	2
SECURITY ALERT	3
CONNECTION SCHEME	4
CHARACTERISTICS	7
POWER SUPPLY	7
CONFIGURATION	8
USE OF COMPOSITOR SW67150	8
NEW PROJECT / OPEN PROJECT	9
SET COMMUNICATION	10
RECIVE NMEA	11
DEFINE SDO (STEP 3)	12
DEFINE TPDO	13
TRANSMIT NMEA	14
DEFINE SDO (STEP 4)	15
DEFINE RPDO	16
UPDATE DEVICE	17
CHARACTERISTICS OF THE CABLES	18
MECHANICAL DIMENSIONS	19
ORDER CODE	20
ACCESSORIES	20
DISCLAIMER	21
OTHER REGULATIONS AND STANDARDS	21
WARRANTIES AND TECHNICAL SUPPORT	22
RETURN POLICY	22
PRODUCTS AND RELATED DOCUMENTS	22

UPDATED DOCUMENTATION:

Dear customer, we thank you for your attention and we remind you that you need to check that the following document is:

- Updated
- Related to the product you own

To obtain the most recently updated document, note the "document code" that appears at the top right-hand corner of each page of this document.

With this "Document Code" go to web page www.adfweb.com/download/ and search for the corresponding code on the page. Click on the proper "Document Code" and download the updates.

To obtain the updated documentation for the product that you own, note the "Document Code" (Abbreviated written "Doc. Code" on the label on the product) and download the updated from our web site www.adfweb.com/download/

REVISION LIST:

Revision	Date	Author	Chapter	Description
1.000	12/07/2010	Dp	All	First release version
1.001	11/02/2013	Nt	All	Added new chapters

WARNING:

ADFweb.com reserves the right to change information in this manual about our product without warning.
ADFweb.com is not responsible for any error this manual may contain.

TRADEMARKS:

All trademarks mentioned in this document belong to their respective owners.

SECURITY ALERT:

GENERAL INFORMATION

To ensure safe operation, the device must be operated according to the instructions in the manual. When using the device are required for each individual application, legal and safety regulation. The same applies also when using accessories.

INTENDED USE

Machines and systems must be designed so the faulty conditions do not lead to a dangerous situation for the operator (i.e. independent limit switches, mechanical interlocks, etc.).

QUALIFIED PERSONNEL

The device can be used only by qualified personnel, strictly in accordance with the specifications.
Qualified personnel are persons who are familiar with the installation, assembly, commissioning and operation of this equipment and who have appropriate qualifications for their job.

RESIDUAL RISKS

The device is state of the art and is safe. The instrument can represent a potential hazard if they are inappropriately installed and operated by personnel untrained. These instructions refer to residual risks with the following symbol:

This symbol indicates that non-observance of the safety instructions is danger for people to serious injury or death and / or the possibility of damage.

CE CONFORMITY

The declaration is made by us. You can send an email to support@adfweb.com or give us a call if you need it.

CONNECTION SCHEME:

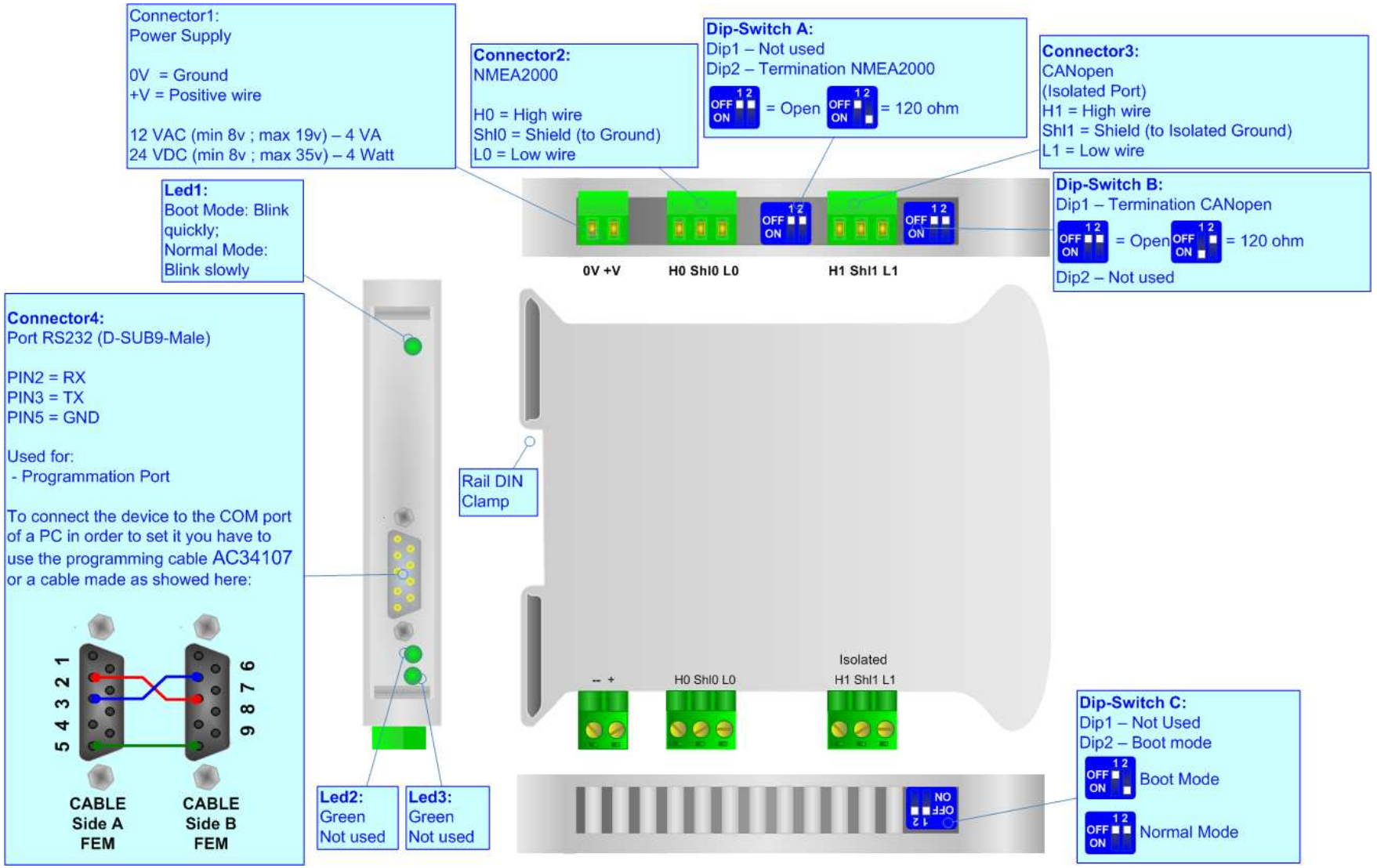


Figure 1: Connection scheme for HD67250-A1

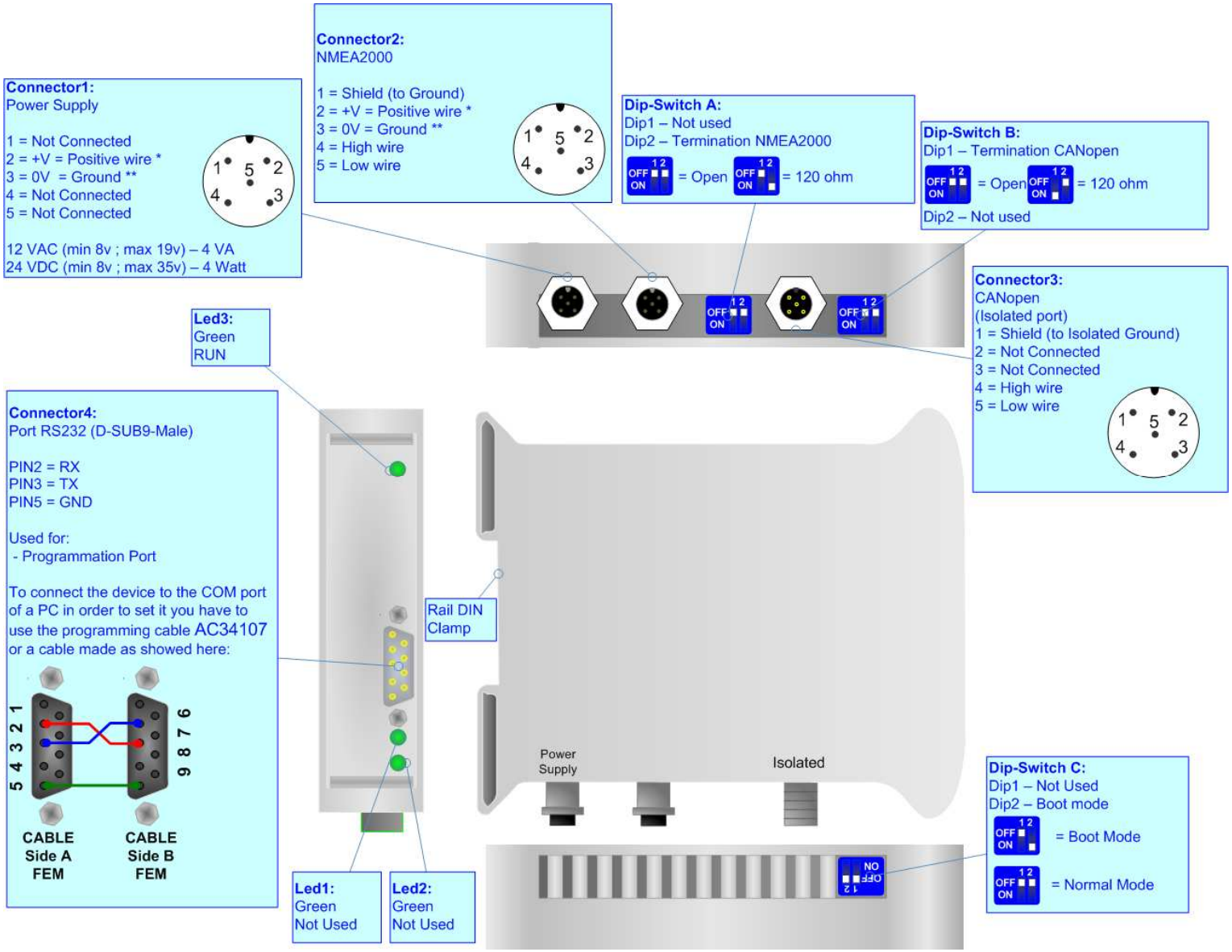


Figure 2: Connection scheme for HD67250-A3

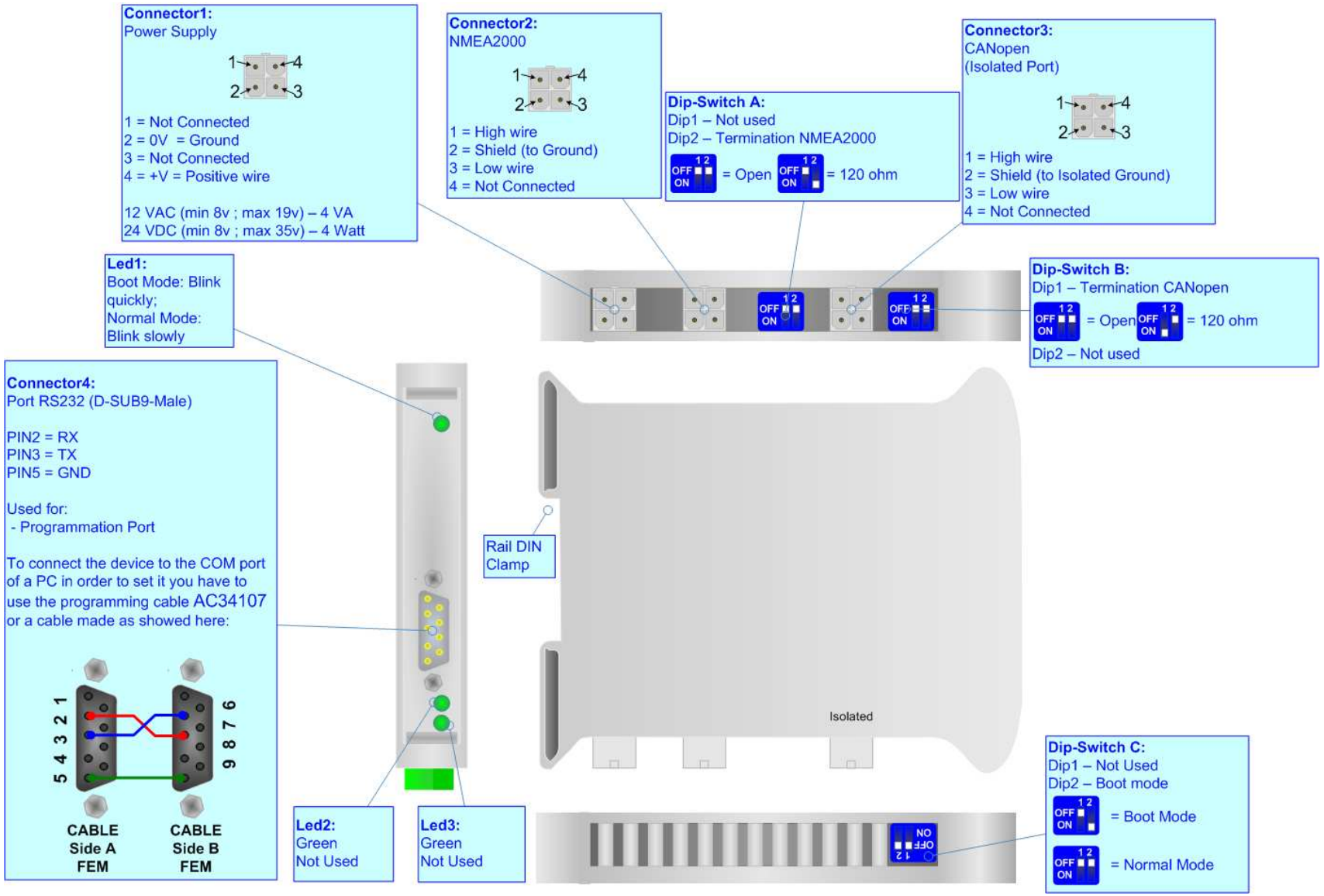


Figure 3: Connection scheme for HD67250-A4

CHARACTERISTICS:

The NMEA2000 / CANopen - Converter allows the following characteristics:

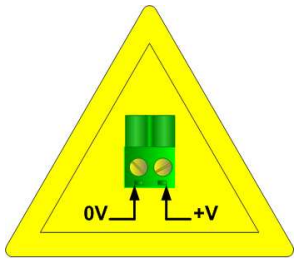
- Two-directional translation of information between NMEA2000 and CANopen networks;
- Electrical isolation between two Buses;
- Temperature range -40°C to 85°C.

POWER SUPPLY:

Recommended Power Supply	
VDC	**VAC**
24v	**12v**

VDC		VAC	
Vmin	**Vmax**	**Vmin**	**Vmax**
8v	**35v**	**8v**	**19v**

Caution: Not reverse the polarity power .



HD67250

CONFIGURATION:

The "NMEA2000 / CANopen - Converter", allows a NMEA2000 network to communicate with a CANopen network.

You need Compositor SW67250 software on your PC in order to perform the following:

- Define the parameter of NMEA2000;
- Define the parameter of CANopen;
- Define the SDO;
- Define the TPDO;
- Define the RPDO;
- Define which NMEA200 frames are readable from the CANopen;
- Define which NMEA2000 frames are writable from the CANopen.

USE OF COMPOSITOR SW67250:

To configure the Gateway, use the available software that runs with Windows, called SW67250. It is downloadable on the site www.adfweb.com and its operation is described in this document.

When launching the SW67250 the right window appears (Fig. 4):

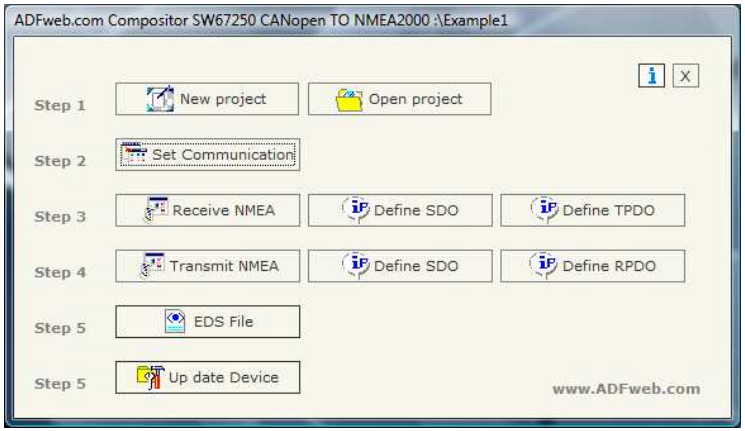


Figure 4: Main window for SW67250

The following explains the function of the buttons:

NEW PROJECT / OPEN PROJECT:

The "New Project" button creates the folder which contains the entire device configuration.
A device configuration can also be imported and exported:

- To clone the configurations of a Programmable NMEA2000 to CANopen Gateway in order to configure another device in the same manner, it is necessary to maintain the folder and all its contents.
- To clone a project in order to obtain a different version of the project, it is sufficient to duplicate the project folder with another name and open the new folder with the button "Open Project".

When a new project is created or an existent project is open, it will be possible to access the various configuration section of the software:

- **Set Communication;**
- **Receive NMEA;**
- **Transmit NMEA;**
- **Define SDO;**
- **Define TPDO;**
- **Define RPDO.**

SET COMMUNICATION:

This section defines the fundamental communication parameters of two Buses, NMEA2000 and CANopen.

By pressing the "Set communication" button from the main window of SW67250 (Fig. 4) the window "Set Communication" appears (Fig. 5):

- In the fields "Baud Rate", the velocity of the two buses are defined;
- In the field "Time out Data" insert a time, when this time is elapsed the data isn't reliable, and in the CANopen register you can read "FFFF";
- If the field "Enable Peer to Peer" is checked is taken in consideration only the PGN field and not the ID Device field;
- If the field "Set Operational State at Start-Up" is checked, when the device is switched on it goes in operational mode otherwise in pre-operational mode;
- If the field "Network Start at Start-up" is checked, when the device is switched on it puts in Operational Mode all the nodes presents on the network;
- In the field "Delay" insert a time, this time indicates how many seconds the gateway wait before sending the message of Start-up;
- In the field "ID Dev.", the CANopen address is defined;
- If the field "Send Frame on Data Change" is checked, the frames are sent when the data are changed; otherwise if the field "Send Frame Every xx ms" is checked you have to insert a value in the field and then the frames defined in the "Send Frames" table are sent every xx ms.

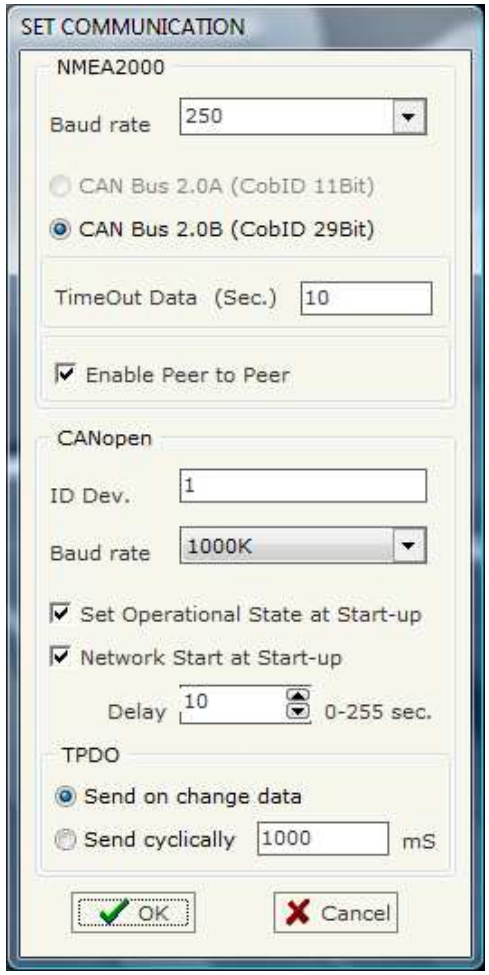
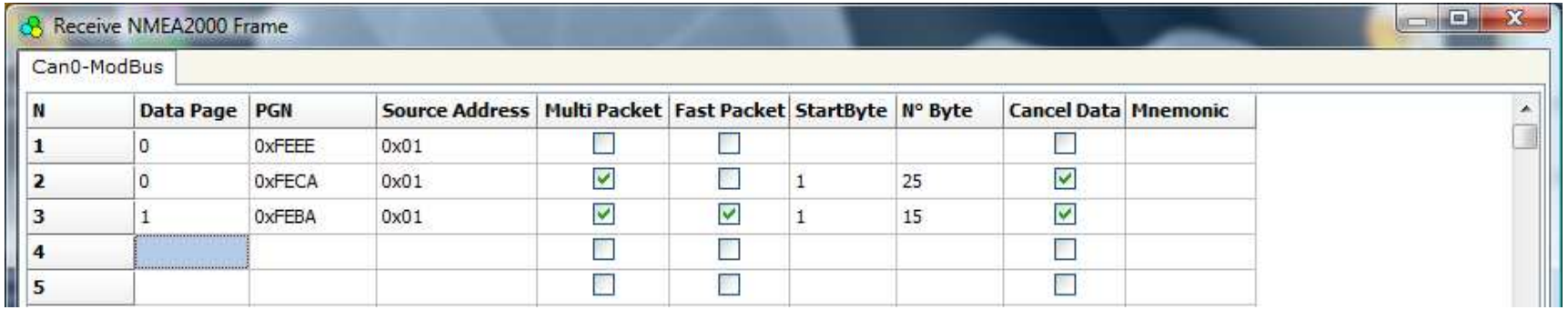


Figure 5: "Set Communication" window

RECEIVE NMEA:

By pressing the "Receive NMEA" button from the main window of SW67250 (Fig. 4) the window "Receive NMEA2000 frame" appears (Fig. 6):



N	Data Page	PGN	Source Address	Multi Packet	Fast Packet	StartByte	N° Byte	Cancel Data	Mnemonic
1	0	0xFEEE	0x01	☐	☐			☐	
2	0	0xFECA	0x01	☑	☐	1	25	☑	
3	1	0xFEBA	0x01	☑	☑	1	15	☑	
4				☐	☐			☐	
5				☐	☐			☐	

Figure 6: "Receive NMEA2000 frame" window

In the scenario:

- In the field "Data Page" insert the data page, the value is 0 or 1 (usually is 0);
- In the field "PGN" insert the PGN of the data you would like to read from NMEA2000 to DeviceNet (it is an identifier);
- In the field "Source Address" insert the address of the device that sends the frame;
- If the field "Multi Packet" is checked, the Transport Protocol is enabled for the frame otherwise is disable;
- If the field "Fast Packet" is checked the frame could use the Fast Packet Protocol functions;
- In the field "StartByte" insert the Start Byte of the Transport Protocol. Insert a value only if the Multi Frame is enabled;
- In the field "N° Byte" insert the number of bytes that composed the Transport Protocol. Insert a value only if the Multi Frame is enabled;
- If the field "Cancel Data" is checked, the data in the frame will be erased after the expiration of the "TimeOut Data";
- In the field "Mnemonic" the description for the frame is defined.

DEFINE SDO (Step 3):

By pressing the "Define SDO" button from the main window of SW67250 (Fig. 4) in "Step 3" the window "Receive NMEA2000 Frame Info SDO" appears (Fig. 7):

- In the field "Correlated" there are PGN and ID_DEV who you insert in the list (Receive NMEA2000);
- In the field "SDO" there are the SDO frames;
- In the field "Index SDO" there is the address of the SDO;
- In the field "SubIndex SDO" there is the SubIndex of SDO;
- In the field "Dimension SDO" is possible to select the dimension of the SDO;
- Depending on the dimension of SDO it is possible to enter from one to four byte of NMEA2000 frame and then it is possible to set on that NMEA2000 byte insert the SDO byte;
- With "Delete, New, Modify, Copy, Paste" buttons it is possible to delete, add, modify, copy and paste a SDO;

For example:

Click on the PGN, insert the valid Index, SubIndex and Dimension for the SDO, then select which bytes of the NMEA2000 frame map in the SDO bytes and click the "New" button for create a new SDO. In the field SDO appears the names of SDO (The first SDO is named IND SDO 0, second IND SDO 1, third Ind SDO 2 and so on).

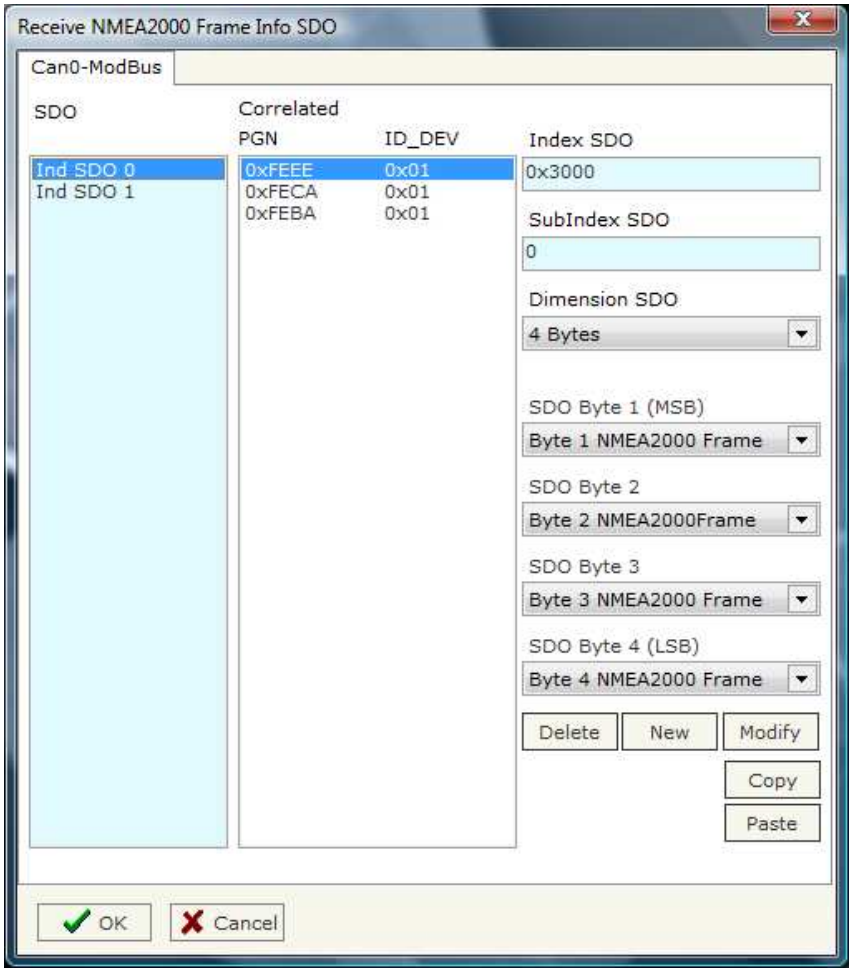


Figure 7: "Receive NMEA2000 Frame Info SDO" window

DEFINE TPDO:

By pressing the "Define TPDO" button from the main window of SW67250 (Fig. 4) the window "Transmit NMEA2000 Frame Info PDO" appears (Fig. 8):

- In the field "COB-ID" it is possible to insert the COB-ID of the PDO frame;
- In the field "Dimension" it is possible to insert the number of Byte (Max=8 Byte) of the PDO frame;
- In the field "NMEA2000 Frame" it is possible to select one of the NMEA2000 Frame created with the window "Receive NMEA2000 Frame".
- In the field "Mnemonic" the description for the PDO is defined.

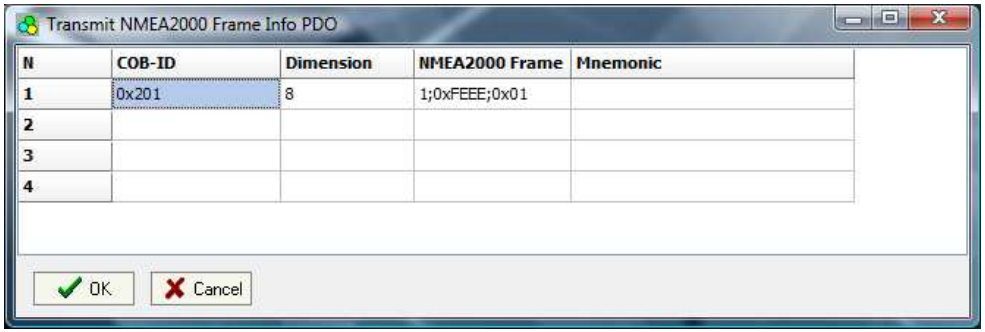


Figure 8: "Transmit NMEA2000 Frame Info PDO" window

TRANSMIT NMEA:

By pressing the "Transmit NMEA" button from the main window of SW67250 (Fig. 4) the window "Transmit NMEA2000 Frame" appears (Fig. 9):

- In the field "Priority" insert the priority of the frame, in NMEA2000 protocol is a number among 0,1,2,3,4,5,6,7. The number 0 is the highest priority and 7 is the lowest;
- In the field "Data Page" insert the data page, in the NMEA2000 protocol is 0 or 1;
- In the field "PGN" insert the PGN of the data you would to write from modbus to NMEA2000. (in the NMEA2000 protocol the PGN is an identifier);
- In the field "ID device" you insert the ID of device that send the frame.
- In the field "Mnemonic" the description for the frame is defined.

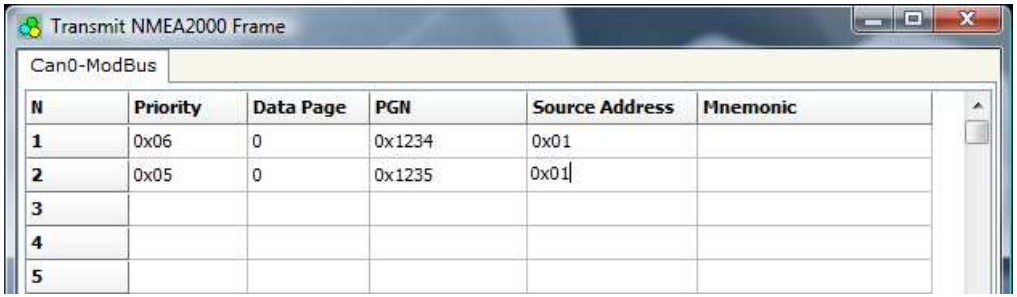


Figure 9: "Transmit NMEA2000 Frame" window

DEFINE SDO (Step 4):

By pressing the "Define SDO" button from the main window of SW67250 (Fig. 4) in "Step 4" the window "Transmit NMEA2000 Frame Info SDO" appears (Fig. 10):

- In the field "Correlated" there are PRIOR, DP, PNG, ID_DEV who you insert in the list (Transmit NMEA2000);
- In the field "SDO" there are the SDO frames;
- In the field "Index SDO" there is the address of the SDO;
- In the field "SubIndex SDO" there is the SubIndex of SDO;
- In the field "Dimension SDO" it is possible to select how many byte insert in the SDO;
- Depending on the dimension of SDO it is possible to enter from one to four byte of NMEA2000 frame and then it is possible to set on that NMEA2000 byte insert the SDO byte;
- In the field "Send Frame when write SDO" it is possible to select "False" for don't sending the NMEA2000 frame when write the SDO or selecting "True" for sending the NMEA2000 frame when write the SDO
- With "Delete, New, Modify, Copy, Paste" buttons it is possible to delete, add, modify, copy and paste a SDO;
- With "Export or Import" buttons it is possible to Export or Import an existing Project.

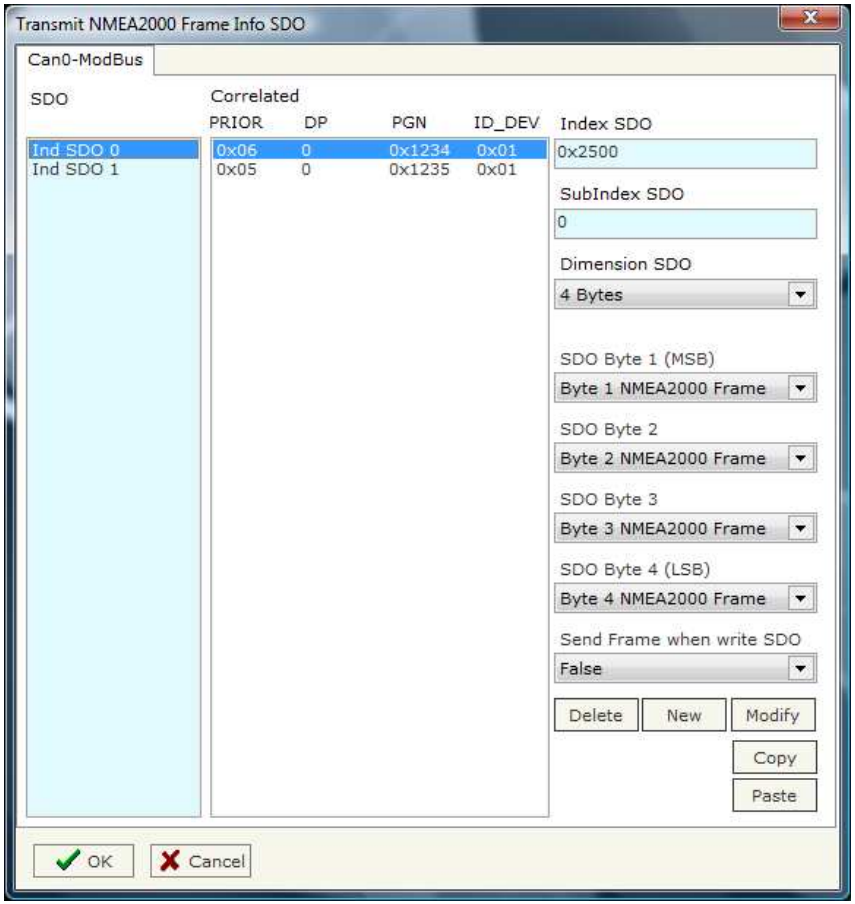


Figure 10: "Transmit NMEA2000 Frame Info SDO" window

DEFINE RPDO:

By pressing the "Define RPDO" button from the main window of SW67250 (Fig. 4) the window "Receive NMEA2000 Frame Info PDO" appears (Fig. 11):

- In the field "COB-ID" it is possible to insert the COB-ID of the PDO frame;
- In the field "Dimension" it is possible to insert the number of Byte (Max=8 Byte) of the PDO frame;
- In the field "NMEA2000 Frame" it is possible to select one of the NMEA2000 Frame created with the window "Transmit NMEA2000 Frame".
- In the field "Mnemonic" the description for the PDO is defined

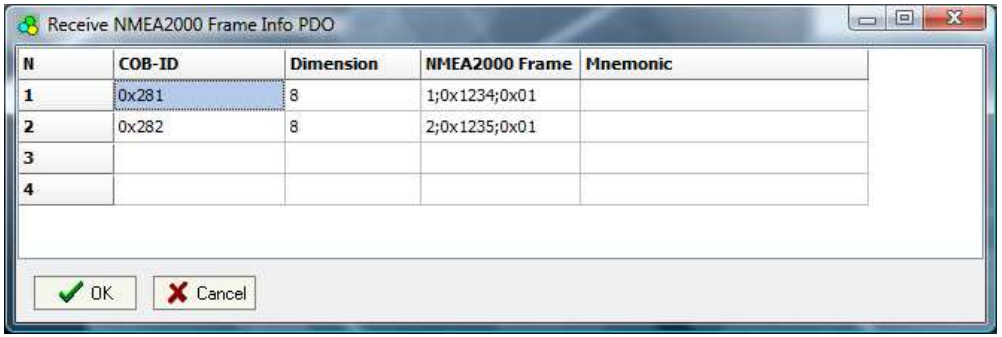


Figure 11: "Receive NMEA2000 Frame Info PDO" window

UPDATE DEVICE:

Section "Update device Serial" (Fig. 12):
In order to load the parameters or update the firmware in the gateway, follow these instructions:

- Turn off the Device;
- Connect the Null Modem Cable Form your PC to the Gateway;
- Insert the Boot Jumper (see the Connection Scheme for more info);
- Select COM port and press the "Connect" Button;
- Turn on the device;
- Press the "Next" Button;
- Select which operations you want to do. Can select only Firmware or only Project or both;
- Press the "Execute update firmware" to start the upload;
- When all the operation are "OK" turn off the device;
- Disconnect the Boot jumper;
- Disconnect the RS232 Cable;
- Turn on the device

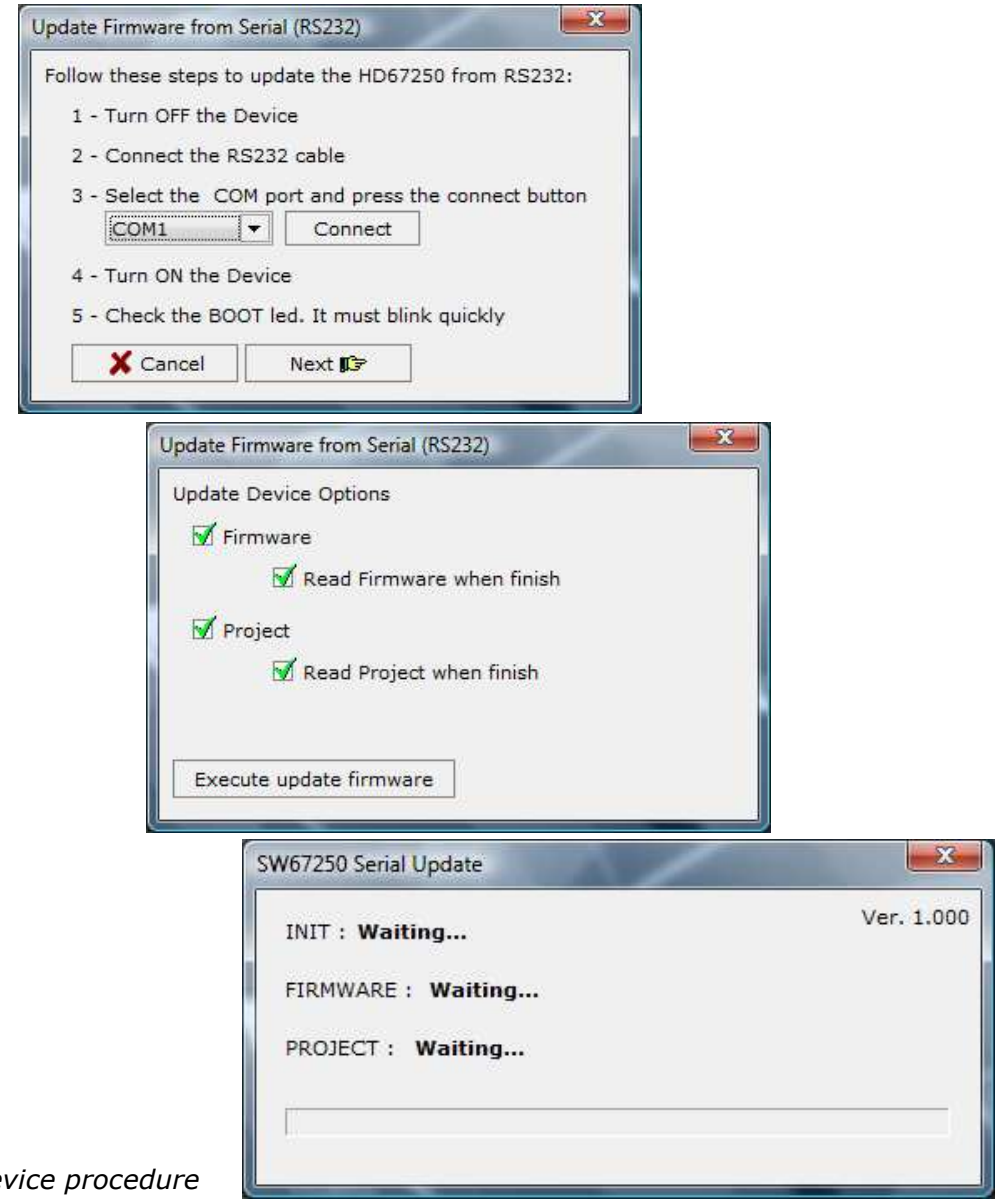
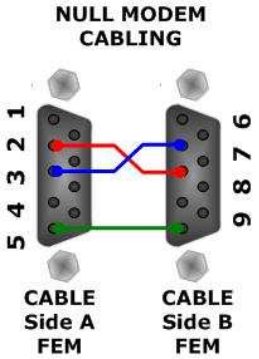

Update Firmware from Serial (RS232)
Follow these steps to update the HD67250 from RS232:
1 - Turn OFF the Device
2 - Connect the RS232 cable
3 - Select the COM port and press the connect button
COM1
Connect
4 - Turn ON the Device
5 - Check the BOOT led. It must blink quickly
Cancel
Next
Update Firmware from Serial (RS232)
Update Device Options
Firmware
Read Firmware when finish
Project
Read Project when finish
Execute update firmware
SW67250 Serial Update
Ver. 1.000
INIT : Waiting...
FIRMWARE : Waiting...
PROJECT : Waiting...

Figure 12: Update device procedure

CHARACTERISTICS OF THE CABLES:

The connection from RS232 socket to a serial port (example one from a personal computer), must be made with a Null Modem cable (a serial cable where the pins 2 and 3 are crossed).
It is recommended that the RS232C Cable not exceed 15 meters.



MECHANICAL DIMENSIONS:

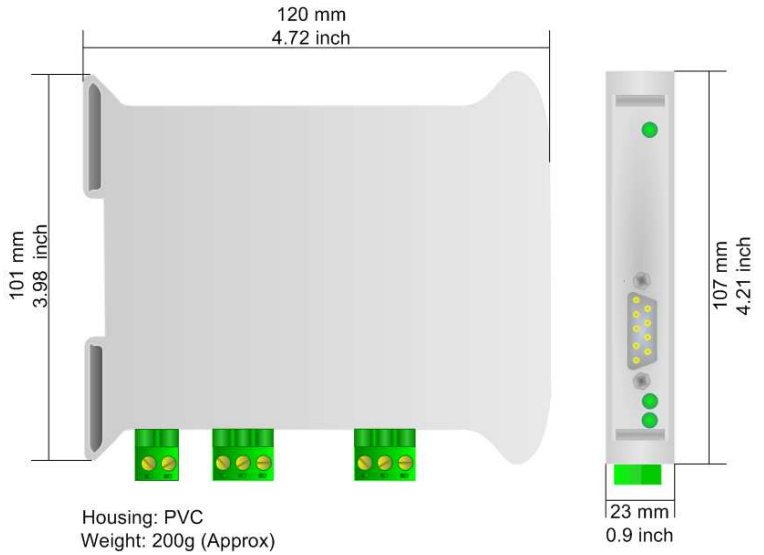


Figure 13: Mechanical dimensions scheme HD67250-A1

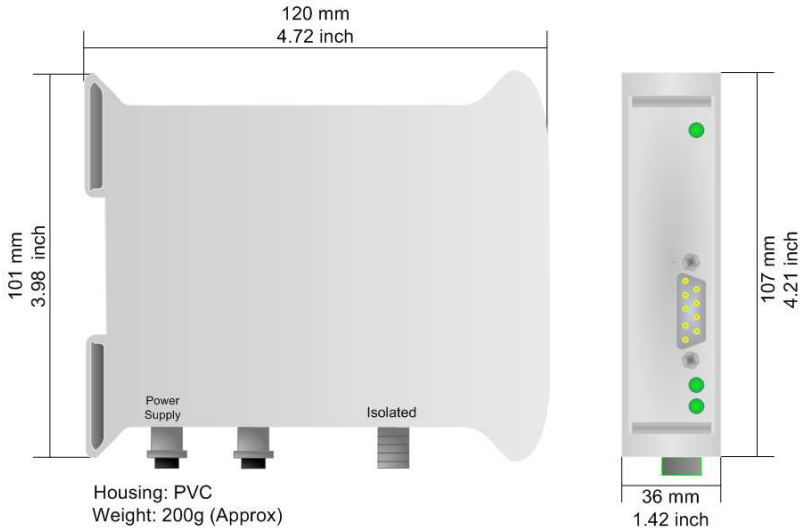


Figure 14: Mechanical dimensions scheme HD67250-A3

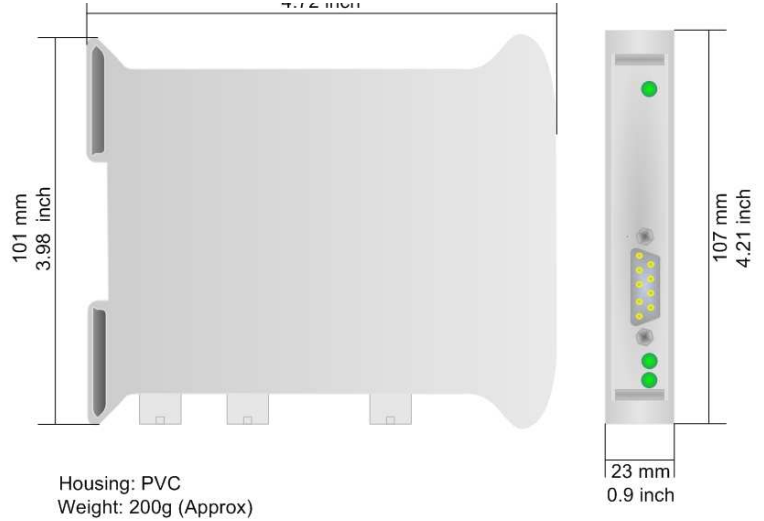


Figure 15: Mechanical dimensions scheme HD67250-A4

ORDER CODE:

Order Code: **HD67250-A1** **-**NMEA2000 / CANopen - Converter

Order Code: **HD67250-A3** **-**NMEA2000 / CANopen - Converter

Order Code: **HD67250-A4** **-**NMEA2000 / CANopen - Converter

ACCESSORIES:

Order Code: **AC34107** **-** Null Modem Cable Fem/Fem DSub 9 Pin 1,5 m

Order Code: **AC34114** - Null Modem Cable Fem/Fem DSub 9 Pin 5 m

Order Code: **AC34001** **-** Rail DIN - Power Supply 220/240V AC 50/60Hz – 12 V AC

Order Code: **AC34002** **-** Rail DIN - Power Supply 110V AC 50/60Hz – 12 V AC

DISCLAIMER

All technical content within this document can be modified without notice. The content of the document content is a recurring audit.
For losses due to fire, earthquake, third party access or other accidents, or intentional or accidental abuse, misuse, or use under abnormal conditions repairs are charged to the user. ADFweb.com S.r.l. will not be liable for accidental loss of use or inability to use this product, such as loss of business income. ADFweb.com S.r.l. shall not be liable for consequences of improper use.

OTHER REGULATIONS AND STANDARDS

WEEE INFORMATION

Disposal of old electrical and electronic equipment (as in the European Union and other European countries with separate collection systems).
This symbol on the product or on its packaging indicates that this product may not be treated as household rubbish. Instead, it should be taken to an applicable collection point for the recycling of electrical and electronic equipment. If the product is disposed correctly, you will help prevent potential negative environmental factors and human health, which could otherwise be caused by inappropriate disposal. The recycling of materials will help to conserve natural resources. For more information about recycling this product, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

RESTRICTION OF HAZARDOUS SUBSTANCES DIRECTIVE

The device respects the 2002/95/EC Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (commonly referred to as Restriction of Hazardous Substances Directive or RoHS).

CE MARKING

The product conforms with the essential requirements of the applicable EC directives.

WARRANTIES AND TECHNICAL SUPPORT:

For fast and easy technical support for your ADFweb.com SRL products, consult our internet support at www.adfweb.com.
Otherwise contact us at the address support@adfweb.com

RETURN POLICY:

If while using your product you have any problem and you wish to exchange or repair it, please do the following:

1) Obtain a Product Return Number (PRN) from our internet support at www.adfweb.com. Together with the request, you need to provide detailed information about the problem.
2) Send the product to the address provided with the PRN, having prepaid the shipping costs (shipment costs billed to us will not be accepted).

If the product is within the warranty of twelve months, it will be repaired or exchanged and returned within three weeks.
If the product is no longer under warranty, you will receive a repair estimate.

PRODUCTS AND RELATED DOCUMENTS:

Part	Description	URL
HD67121	Gateway CANopen / Canopen	www.adfweb.com?product=HD67121
HD67502	Gateway CANopen / Modbus - RTU	www.adfweb.com?product=HD67502
HD67004 HD67505	Gateway CANopen / Modbus – Ethernet TCP	www.adfweb.com?product=HD67004
HD67134	Gateway CANopen / DeviceNet	www.adfweb.com?product=HD67134
HD67117	CAN bus Repeater	www.adfweb.com?product=HD67117
HD67216	CAN bus Analyzer	www.adfweb.com?product=HD67216